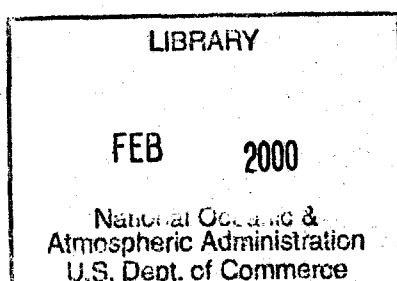


GOVERNMENT OF INDIA
METEOROLOGICAL DEPARTMENT

INDIA WEATHER REVIEW, 1953
ANNUAL SUMMARY

PART B

SNOWFALL



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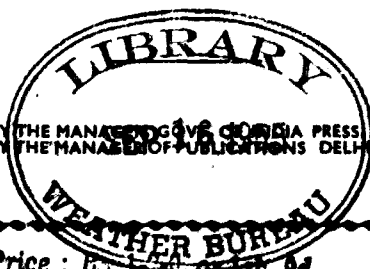
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Director General of Observatories



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INDIA WEATHER REVIEW, 1953

ANNUAL SUMMARY

PART B

SNOWFALL

This part contains a summary of the reports of snowfall in the mountain regions to the north of India. These reports are collected by local officers from the local residents, headmen of villages or from travellers, who have passed through the region and are then transmitted to this office.

The amount of snowfall is usually measured by finding the depth of undisturbed snow lying on the ground. The measurements are given in feet and inches. At places provided with raingauges the snow collected in the gauge is melted and measured as rain and given in inches and cents.

Winter Period, January and February

I—JAMMU AND KASHMIR

Skardu.—No reports were received.

Dras.—There were a few falls in January and February. Snow accumulation at the end of January was 3' on the ground and 6' on the surrounding peaks and passes. In February there was 3' of snowfall at the station and on the peaks and passes. The accumulation of snow at the end of the period was 6' on the ground and 9' on the higher passes. Snowfall was below normal in January and February and the weather was unusually cold in these two months.

Srinagar.—Several light to moderate falls of snow were observed on the surrounding mountains and in the main valley both in January and February. The heaviest fall in January was 0.75" recorded on the 26th and in February 0.36" on the 5th. The total precipitation amounted to 2.29" in January and was below normal by 0.61" while it amounted to 1.16" during February, being much below normal. Snowfall during the period was less than usual while accumulation on the surrounding mountains was appreciable.

Kargil.—Snow fell at the station and on the surrounding mountains on nine days in each of the months January and February. The depth of the falls in January and February varied from 1½' to 2' and 1' to 2' respectively on the ranges and 1' to 1' 4" and 1½" to 3" on the ground. Snow accumulation at the end of the period was 3' to 4' on the well-known peaks and 2" to 3" on the ground. The falls were reported to be below normal in both the months.

Sonemarg.—Snowfall occurred at the station as well as on the well-known Zojilla and Nichnay passes on 7 days in January and on 5 days in February. The depth of the falls varied from 1" to 15" in January and from 2" to 2' in February. The accumulation of snow at the end of January and February was 4½' and 4' respectively on the ground and 6' and 5' on the passes of Zojilla and Nichnay. The falls were about normal in January and below it in February.

Gurez.—There were several falls of snow both in January and February. Accumulation at the end of the period was about 3½' in the valley and 8' on the surrounding hills and the well-known Rajdhani pass. The falls were reported to be above normal in these two months.

Leh.—At the station proper and on the surrounding hills, snow fell on 7 days in January and on 5 days in February. The snowline was below 10,000' in January and about 12,000' in February. The accumulation of snow at the end of the period was 5' to 7' at a height of about 18,000'. Snowfall during and accumulation at the end of the period were much below normal.

II.—THE PUNJAB (I) (INCLUDING PEPSU AND DELHI)

Chamba—Dalhousie Range.—In January snow fell on 7 days at Kalatope and Sunkhigalle to a total depth of 8' 3" and 3' 4" respectively. In February it snowed on 3 days at Kalatope to a total depth of 11". Accumulation at the end of January was estimated to be 4' 6" at a height of 7,850' over Kalatope whereas it was 4" in the warmer aspects and 7" in the cooler aspects at Sunkhigalle. In February, the snow melted away in the warmer aspects while in the cooler aspects the accumulation was 3' 2" at Kalatope and 4' 3" at Daikund Dhar. The falls were normal in January and below it in February.

Upper Chamba Range.—Snowfall occurred on four occasions in January and only once in February. Accumulation on Baliemi and Bohar passes was 6' to 8' and 5' to 7' respectively at the end of the period. The snowline descended to 3,000' a.s.l. in January and the passes were unpassable. The falls were reported to be normal both in January and February.

Bhandal Range.—January witnessed 6 falls with depth ranging from 2" to 2' 2" while February recorded none. The total depth of the falls in January at Bhandal at a height of 5,600' was 7' which was also reported to be the accumulation at the end of the month. In January snowfall was above normal.

Pangi Range.—Snowfall was observed on 10 days in January and on 4 days in February. The depth of the falls was 4' 7" in January and 2' in February. The accumulation of snow at Killar at a height of 8,400' above sea level was 3' 8" and 2' at the end of January and February respectively. Snowfall was above normal in January and below it in February.

Bhattyat Range.—There were two snowfalls each of depth 1½' on the high hills of Ghalu, Bari Sugari and Basodan during January. Accumulation up to the end of January was 3' to 4' on the high hills. Snowfall was less than that of the previous years. No report for February was received.

Mandi (Nachan division).—There were three snowfalls in January and one in February. The depth of the individual falls varied from 1' to 3' at different places. Accumulation at the end of the period varied from 1' to 10' in this division. Snowfall was above normal.

Kangra.—Snowfall occurred on the high ranges of Himalayas in Kangra, Palampur Tahsil and Kulu sub-division both in January and February, the total depth of the falls being about 7' in January. The maximum snowfall was 16' in Seraj Tahsil during January and 8' in Kulu sub-division during February. Accumulation at the end of each month of the period is given below :—

Locality	Pass	January	February
		ft.	ft.
Palampur	Amaur	8	9
	Swar	8	9
	Sangra	7	8
Kulu subdivision	Hampta	10	26
	Rohtang	17	24
	Bashleo	13½	14½
	Jalori	11½	13

Snowfall was reported to be normal in January and below it in February.

Rajgarh.—Snowfall occurred twice in the ranges in each of the months of the period under report. The total depth of snow in January and February was 8' and 2' respectively. Accumulation on the high peaks was 8' and 3' at the end of each of these two months. The falls were above normal both in January and February.

Mahasu (Jubbal Tahsil).—There were 7 falls in January and 4 in February. The depth of the falls ranged from 3" to 1' 6" in January and 2" to 11" in February. The total depth of the falls was about 9' in January and 2' in February. The falls were below normal.

Chopal (Jabbal Forest division).—Snowfalls accompanied by snowstorms were observed on the higher elevations during January. The depth of falls varied from 2' to 6' 3" at the various places and the snowline

descended to 5,630' a.s.l. Due to heavy snow accumulation, the passes were blocked. The falls were abnormally heavy and unusually prolonged in character. Snowfall was above normal.

Arki.—No snowfall occurred during this period.

Shilaroo.—Six falls with depth varying from 1½' to 2' were reported from this locality during January. The snowline descended to 6,000' a.s.l. in this month. The falls were above normal.

Suni.—In January snow fell on 6 days in Seraj area and on 4 days in Chantha area, while in February it occurred on 3 days at the former and on 4 days at the latter. The depth of the falls ranged from ½' to 1'. Accumulation was 3½' at the end of January and 1' at the end of February. Snowfall was nearly normal in both the months.

Chopal.—Snowfall was experienced in this Tahsil on 10 occasions in January and on 3 occasions in February. The depth of the falls at Chopal proper varied from 1" to 2½' in January and 1½" to 3" in February while on the higher elevations, it ranged from 2" to 7'. Snow accumulated on the higher passes to a depth of about 5' at the end of January and had almost melted away on the lower elevations at the end of January and on all elevations at the end of February. The falls were about normal during the period.

Chini Range (Raingauge station).—Snowfall was observed on 13 days in January and on 5 days in February. The depth of the falls varied from ½" to 1" in both the months, the total depth amounting to 3' 4¾" in January and 2' ¾" in February. The snowline descended to the banks of the river Sutlej (6,000' a.s.l.) during the period. Snow accumulation at the end of January was reported to be 3' 4¾" at Chini proper. The passes were closed for traffic and nothing could be guessed about accumulation there. The falls were about normal.

Rohri.—There were 5 falls in January and 6 in February. The depth of the falls at different elevations varied from 4" to 4' in January and 1" to 3' in February. The falls were above normal in these two months.

Kumarsain.—There were one snow storm and one heavy snowfall in January, the depth of snow ranging from 2" to 3½' at different elevations. Accumulation at Hatu Peak was 3½' at the end of the month and the snowfall was above normal. No report for February was received.

Upper Bushahr F. Division (Nihar Raingauge station).—There were a number of light and heavy snowfalls during this period. The total depth of the falls at the station proper was 5½' in January and 2' 7" in February. These amounts were also reported to be the accumulations at the end of the respective months. Snow accumulation on the high peaks and passes was said to be 16' to 18' at the end of the period. The falls were above normal both in January and February.

Upper Bushahr Forest Division (Kilba Kailash Range).—It had been snowing almost throughout the month of January in this range, the total depth of snowfall at the different raingauge stations being as under :—

Kilba	2'-3"
Sangla	5'-1"
Purhari	2'-10"

In February, there had been 8 falls of snow with the snowline descending to an elevation of 5,600'. All the passes were blocked. Snowfall was above normal in both the months.

Lower Bushahr Forest Division—Khadrala and Bashla.—Snowfalls and snowstorms occurred in abundance at these stations, there being 9 falls in January and 4 in February. The depth of the falls varied from 0.3" to 3.6" at Khadralla and from 0.1" to 2.1" at Bashla. The total depths at these places were 12.9" and 5.4" in January and 3.3" and 1.2" in February which were also reported to be the accumulations at the end of the respective months. Snowfall was above normal both in January and February.

Simla.—There was one snowfall of depth 4' in January, accumulation at the end of the month being 2' on the Jakko peak. Snowfall was above normal. The report for February was not received.

III—UTTAR PRADESH

Garhwal.—There were 10 snowfalls in January and 3 in February. The depth of the falls on the higher elevations varied from $\frac{1}{4}$ ' to 6' in January and $\frac{1}{6}$ ' to 2' in February. These amounts were also reported as accumulations at the end of the respective months. Snowfall was above normal in January and below it in February.

Tehri Garhwal.—Snow fell on 9 days in January and on 2 days in February, the depth of the falls varying from 1' to 10' and 1" to 1' respectively. The snowline descended to 3,000' a.s.l. in January and 4,000' a.s.l. in February. Snowfall was below normal in these months.

Almora.—The following table gives the estimated amounts of the falls during and accumulation at the end of January and February.

Locality	January	February
	ft.	ft.
<i>Falls</i>		
1. Malla Danpur	8	..
2. Malla Johar	10-12	..
3. Chaudans	5	..
4. Byans	2-3	..
5. Malla Darma	10	..
<i>Accumulations</i>		
1. Kotila Hill	6	5-6.
2. Kotila Valley	15-25	15-25
3. Kafini Hill	20-35	20-35
4. Kafini Valley	25-30	25-30
5. Bankatia	20-30	20-30
6. Pinder Valley	60-70	60-70
7. Pinder Peak	30-40	30-40
8. Nandha Khat	30-45	30-45
9. Sundardhunga Valley	25-30	25-30
10. Sundardhunga Peak	15-20	15-30
11. Lipia	3	$\frac{1}{2}$
12. Lipu	2	3
13. Nebudhura	10	$2\frac{1}{2}$

The falls were reported to be above normal in January and below it in February.

Mukteswar (Kumaun) Observatory.—5 light to moderate falls were observed in January and 1 light fall in February. The amount of water on melting the snow of the individual falls varied from 5 cents to 1.95" during the period, the total amount being 2.97" in January and 5 cents in February. The falls were above normal in both the months.

IV—ASSAM

Darjeeling.—Snowfall occurred on 4 days in January, the depth of the falls ranging from $\frac{1}{4}$ " to $3\frac{1}{4}$ " at different areas of the place. Accumulation at the end of the month was $1\frac{1}{4}$ " at the observatory and 2" to $3\frac{1}{4}$ " on the hills. The falls were above normal in this month. No report was received for February.

Sela-sub-agency.—There were frequent snowstorms over the high peak during the period under report. The depth of snowfall in January was 2' 3" at Tawang proper. Snowline was generally at 10,500', but occasionally it came down to 7,000'. Accumulation over the higher passes and ranges was estimated to be about 3'. Snowfall was above normal.

Hot Weather Period, March to May

I.—JAMMU AND KASHMIR

Skardu.—No reports were received.

Dras.—No report for March was received. Snowfall occurred at the station as well as on the high peaks and passes on 7 occasions in April and only on the high peaks and ranges on several occasions in May. The total depth of the falls in April was about 3' at the station and 6' on the well-known peaks and passes. Snow accumulation at the end of April and May was nil at the station and about 9' and 6' respectively on the higher peaks. The falls were normal in April.

Srinagar.—Several light to moderate falls of fresh snow were observed on the surrounding mountains during March and April. No snowfall occurred either on the surrounding mountains or in the valley proper during May. At the end of the period, however, snow was existing on the tops of the mountains. Snowfall during the period was below the average.

Kargil.—Snow fell at the station and on the mountains on 14 days in March, the depth of the individual falls varying from $\frac{1}{2}$ " to 6" on the ground and $1\frac{1}{2}$ ' to $2\frac{1}{2}$ ' on the mountains. In April, 2 falls of depth 2" and 4" were observed on the high peaks while no snowfall occurred in May either at the station or on the high mountains and peaks. Snow accumulation on the high peaks was 9' to 10', 2' to 3' and 5' at the end of March, April and May respectively. The falls were about normal in March and below it in April and May.

Sonemarg.—Snowfall, with depth of the individual falls ranging from 2" to 2' 6" was observed at the station and on the well known Zojilla and Nichnay passes on 7 days in March and on 3 days in April. The total depth of the falls was 7' 1" in March and 1' 7" in April. In May, no snowfall was reported to have fallen either on the ground or on the mountains. Snow accumulation at the end of March was $3\frac{1}{2}$ ' on the ground and 5' on the Zojilla and Nichnay passes, while at the end of the April and May it was 3' and $1\frac{1}{2}$ ' respectively on the Zojilla and Nichnay passes. The falls were reported to be normal during the period.

Gurez.—There were several snowfalls in the valley and on the surrounding hills and the well-known Razdani pass in March and April. The depth of the falls on the hills and Razdani pass was about 6' in March and 4½' in April. These amounts were also reported to be the accumulations at the end of the respective months. The falls were above normal in these two months. No report for May was received.

Leh.—Snow fell at the station and on the surrounding hills on 10 days in March and on 5 days in April. At the station, the falls varied from a few flakes in March to a depth of 3" in April and were more on the hills. The snowline descended to a height of 10,500' in April. No snowfall was reported in May. Snow accumulation at the end of April and May was 6' to 10' and 5' respectively at 18,000' on the northern slopes and 4' to 6' and 1' to 2' on the southern slopes. The falls were normal in March and April and accumulation slightly above normal at the end of the period.

II.—THE PUNJAB (I) (INCLUDING PEPSU AND DELHI)

Chamba.—No snowfall occurred in any of the ranges of this district during the period under report except 2 falls on the Upper Chamba Range in March and a few falls on the high hills of Dalhousie and Bhandal Ranges. Snow accumulation on the Pangi Pass (14,500 ft.) and Padhari Pass (12,000 ft.) was 5' and 3' respectively at the end of the period. The snowline descended to 8,500' in March. The falls, as estimated from the available reports, were found to be about normal.

Mandi.—There was no snowfall in March and May. One fall with depth ranging from 2" to 1' 3" at the different passes was observed on the higher elevations in April. Snow accumulation at the end of each of the months was as under :—

Locality	March	April	May
Bhubhu Peak . . .	1'-0"	1'-0"	3"
Shikari Devi . . .	1'-6"	4"	Nil
Samehni . . .	Nil	4"	Nil
Raigarh . . .	Nil	2"	Nil
Tunga Devi . . .	Nil	1'-6"	Nil
Kandhi . . .	Nil	3"	Nil

Snowfall was below normal during the period and accumulation normal at the end of May.

Chini.—There were 3 snowfalls of depth 1" to 2" in March and one of 6" in April. The total depth was 5" in March and ½' in April. The snowline descended to 11,000' in March. Accumulation on the higher altitudes could not be ascertained as the passes were blocked. The falls were below normal in March and above it in April. No report for May was received.

Kilba Kailash.—It snowed on the Sangli and Purhari passes of this range both in March and April. In May, there were 6 days of snowfall on Rupan, Busan and Shathul passes. The depth of the falls in March and April varied from 1" to 6" on Sangli and Purhari and was 6" on the highest peak in May. The falls were below normal in March and May and above it in April.

III.—UTTAR PRADESH

Garhwal.—Snow fell on 2 days in March and on 8 days in April. The depth of these falls on the high elevations varied from 1" to 1' 2" in March and 4" to 1½' in April which were also reported to be the accumulations at the end of the months. In May snow fell to a depth of about 6". The falls were below normal in March and above it in April. Snow accumulation at the end of the period was about 2' to 3' on the high peaks and was below normal.

Tehri Garhwal.—There was no snowfall during the period.

Almora.—The following table gives the amount of falls during and accumulation at the end of each of March and April. No report for May was received.

Locality	March	April
	ft.	ft.
<i>Falls</i>		
Byans	9-10	6-9
Malla Darma	7	3
Malla Danpur	4	2-3
Malla Johar	8	No report.
<i>Accumulations</i>		
Kotila Hill	4	3-4
Kotila Valley	15-20	15-20
Kafni Hill	20-25	20-25
Kafni Valley	18-20	18-25
Bankatia Peak	18-25	18-25
Pinder Peak	25-30	25-30
Pinder Valley	40-50	40-50
Nanda Ghat	30-40	30-40
Sunderdhunga Valley	35-40	35-40
Sunderdhunga Peak	20-25	20-25
Lipu	15	6
Lipia	20	9

The falls were below normal in March and above it in April.

IV.—ASSAM

Cachar.—Report for April only was available and indicates that no snowfall occurred in the month.

Monsoon Period, June to September

June and July

I.—JAMMU AND KASHMIR

Skardu.—No reports were received.

Dras.—There was no snowfall at the station proper during the period, but slight snowfall was observed on the peaks and passes both in June and July. Snow accumulation on the peaks and passes was about 2' at the end of both June and July.

Srinagar.—No snowfall occurred either at the station or on the surrounding mountain ranges. Snow of the previous winter was existing on the peaks and gorges of the mountains at the end of June but practically melted away at the end of July.

Kargil.—No snowfall was reported to have occurred anywhere during the period. Snow accumulation on the high peaks was 2' and 1½' at the end of June and July respectively. Accumulation at the end of each of the months was said to be normal.

Sonemarg.—No snowfall was noticed either on the ground or on the passes. There was also no accumulation at the end of the period.

Leh.—The report for June only was received. It indicates that the snowline was between 16,000' and 17,000' and accumulation 1' to 4' at 18,000' which was normal.

II.—THE PUNJAB (I) (INCLUDING PEPSU AND DELHI)

Chamba.—There had been no occurrence of snowfall in any of the divisions or ranges of the district during the period. Snow accumulation at the end of the period varied from 1" to 4' on the high peaks and passes above 12,000' in Churrah Forest Division, and 10" to 15" on Jalsu and Kwarsi (height about 14,000') in Chamba Forest Division and was below normal.

Kulu. (Kangra District).—No snowfall was observed below 19,000' in June and July. The snowline was at 15,000' and the accumulation was normal.

Mandi.—No snowfall was witnessed in any part of the district during the period. There was no snow accumulation below 13,000'.

Kilba Kailash.—There were slight snowfalls above 14,000' in June and 2 falls above 15,000' in July, the depth on Rupan, Busan and Shathul passes being 4½" in June. The snowline was at 14,000' and the falls were below normal in June.

III.—UTTAR PRADESH

Garhwal.—Snowfalls with depth averaging from 2' to 4' above 12,000' and about ½' at 11,000' was observed in June. There was no snowfall in July.

Tehri Garhwal.—No snowfall was noticed during the period.

Almora.—The following table gives the amount of falls during and the accumulation at the end of June. The report for July was not received.

Locality	June
<i>Falls</i>	
Malla Johar	5'
Malla Danpur	1"
Byans	1'

Locality	June
<i>Accumulations</i>	
Kotila Hill	½"
Kotila Valley	6'-10'
Kafini Hill	9'-10'
Kafini Valley	12'-15'
Bankatia	12'-18'
Pinder Peak	200'-250'
Pinder Valley	40'
Nanda Ghat	22'-25'
Sunderdhunga Hill	20'
Sunderdhunga Valley	25'-30'
Lipia	19'
Lipu	11'

The falls in June were below average.

August-September

I.—JAMMU AND KASHMIR

Skardu.—No report was received.

Dras.—Snow fell on 2 days in August and the depth was 2" on the high peaks. The report for September was not received.

Srinagar.—There was no snowfall in August. In September, 3 light snowfalls were observed on the surrounding mountains, but no snow existed there at the end of month. Snowfall was normal in September.

Kargil.—Report for August only was received and it indicates that there was no snowfall in the month, as usual.

Sonemarg.—There was neither snowfall during nor accumulation at the end of the period.

II.—THE PUNJAB (I) (INCLUDING PEPSU AND DELHI)

Chamba.—Snow was reported to have fallen on the high mountains and peaks of the Upper Chamba Range only in September. Snow descended to a height of 10,000'. Snow accumulation on the Baliani pass was 2' at the end of the month.

Mandi.—There was no snowfall during the period.

III.—UTTAR PRADESH

Garhwal.—No report for August was received. Five snowfalls with depth varying from 4" to 8" at a height of 15,000' were observed in September. These amounts were also reported to be the accumulations at the end of the period at the same height. The falls were above the average of the previous years.

Almora.—The report for August only was received. The estimated amount of falls during and accumulation at the end of the month are given below. The falls and accumulation were less than average.

Locality	August
<i>Falls</i>	<i>ft.</i>
Malla Johar	1
Malla Danpur	1
Malla Darma	2
Byans	10
<i>Accumulations</i>	
Kotila Hill	Nil
Kotila Valley	3-4
Kafini Hill	Nil
Kafini Valley	5
Bankatia	8
Pinder Valley	150-200
Pinder Peak	80-100
Nanda Ghat	10
Sundardhunga Valley	10-12
Sundardhunga Hill	5-8
Lipu	6
Lipia	10

Post Monsoon Period
October-December
I.—JAMMU AND KASHMIR

Skardu.—No report was received.

Dras.—Snow fell at the station and on the surrounding high peaks and mountains on 5 days in October, on 3 days in November and on 8 days in December. The depth of the individual falls varied from ½" to 7" in October, ½" to 4" in November and 1" to 3" in December, the total depth being 1' 4½", 5½" and 1' respectively at the station. Snow accumulation at the station proper was nil at the end of October and November and 1' at the end of December. On the peaks it was 1' at the end of October and 3' at the end of November and December. Snowfall was reported to be normal during the period.

Srinagar.—Two snowfalls were observed on the surrounding mountains in October and a few light falls in November. In December, light to moderate or heavy falls of snow were observed on the surrounding mountains as well as in the valley. The snowfall of 2·16" recorded on the 27th of December 1953 was the heaviest in the month. Accumulation on the surrounding mountains was slight at the end of October and November and appreciable at the end of December. Snowfall during and accumulation at the end of the period were normal.

Kargil.—No report for October was received. Snow fell at the station and on the mountains on 3 days each in November and December. The depth of the falls varied from ½" to 2" in November and 1" to 3" in December. Accumulation at the end of November and December was ½" and ½" to 1" respectively at the station.

Sonemarg.—Snowfall occurred at the station and on the Zojilla and Nichnay passes on 1 occasion each in October and December and on 4 occasions in November. The depth of the falls at the station was 1·3" in October, varied from 2" to 4" in November and was

more than 4' in December. Accumulation at the end of December was about 3' on the ground. The falls were about the average in all the three months.

Leh.—There were light snowfalls on the higher elevations above 13,000' on 4 days in October and on 2 days in November. On two of these days snow was noticed at the station also. One light snowfall occurred at a height of above 14,000' in the first week of December and intermittent falls at all heights from 23rd to 31st. The total depth of snowfall at the station was 1½" in November and 1" in December. Snow accumulation on higher altitudes above 18,000' in northern slopes was 2' to 3' at the end of October and 1' to 2' at the end of December while that on the southern slopes was a few inches only. The snowline descended to 15,000' in November and December. Falls and accumulations were below normal.

II.—THE PUNJAB (I) (INCLUDING PEPSU AND DELHI)

Chamba—Upper Chamba Range.—Report for October only was received. In this month there was one snowfall which was earlier than usual and it descended to an altitude of 9,000'. Snow accumulation at the end of the month was 3' on Baliani pass (height 12,000').

Tissa Range.—The only available report for December indicates that there was one fall on the 27th. The snowline descended to 5,000' and accumulation at the end of the month was 8' at Sach pass. Snowfall and accumulation were reported to be less than average.

Bhandal Range.—Snowfall with depth varying from 1" to 6" was recorded at this raingauge station on 4 days in December. Snow accumulation at the end of the month was 1' 2" at the station and the higher passes were covered with snow. Snowfall was average. Reports for October and November are not available.

Bhattiyat Range.—In December snow fell on the high hills of the range, to a depth of about 2' in Gharanu area. Accumulation of snow at Kharademda-jote was about 4' at the end of this month. No reports for October and November were received. Snow fall was said to be normal.

Rajgarh.—Report for December only was available. There were 2 falls of snow in this month and the snow line descended to 6,000' over this range. Snow accumulation at the end of the month was 4' at Chur peak and 3' at Haripur. Snowfall was normal.

Kangra.—Report for December only was received. In this month, snowfall occurred mostly in the last week and the maximum fall was 9' in Kulu sub-division. The snowline descended to 8,000' in the Himalayan ranges. Accumulation at the end of the month was as follows :—

Name of Tahsil	Name of pass	Depth in ft.
Palampur	Anaur	3
	Saugar	2
	Swar	3
Kulu sub-division	Hampta	5
	Rohtang	4
	Bashleo	1½
	Jalori	1

Snowfall was below normal.

Mahasu—Kilba Kailash.—No report for October was received and no fall was reported in November. There were 4 snowfalls in December, the depth being 4" at Kilba, 2' 5" at Purbani and 9" at Sangla. The snowline descended to the level of river Sutlej. Accumulation on Rupan, Pusan and Shathul passes was estimated to be 4' at the end of the period. Snowfall was reported to be normal in December.

Chini.—Report for December only was received. Snow fell on 5 days in this month, the depth of the falls varying from $\frac{1}{2}$ " to 14" at the station. Snow accumulation at the end of the month was 1' 10 $\frac{1}{2}$ " at the station, and was normal.

Lower Pahar Range.—Snow fell at Khadralla and Bashla on 5 days in December, the depth of the falls on different dates being as follows :—

Date	Khadralla	Bashla
26-12-1953	7"	4"
27-12-1953	1"	..
29-12-1953	6"	..
30-12-1953	6"	8"
31-12-1953	12"	10"

Snowfall was below average at Khadralla and above it at Bashla.

Shilaroo.—There were two snowfalls of depth 3" and 9" in December. The snowline descended to 7,500' in this month.

Suni.—Snow fell in Seraj and Santha areas on 2 days in December, the depth of falls in various localities varying from 2" to 1 $\frac{1}{2}$ '. The falls descended to heights of 7,500' in Seraj area and to 900' in Santha area. At the end of the period, snow accumulated to a depth of about 8"-9" but was melting away soon. The falls were above normal for the season.

Kotkhari.—Snowfall occurred near the end of December to a depth of 4" at the station and $\frac{1}{2}$ " on the high peaks. Accumulation at the end of the month was 4" at the station proper and 6" on the high peaks and was above normal.

Taranda Range.—Snowfall commenced on the 27th December in this range. The depth of snow at Nichar Raingauge station was 2" on that date and 1' 2" at a height of 7,100'. Snow fell down to the level of the Sutlej river bank during the month. Snow accumulation on the higher peaks was 2' to 3' at the end of the month. Snowfall was below average.

Pandrabis Range.—Report for December only was received. In this month, 4 snowfalls with depth varying from 1" to 9" were observed at the station as well as on the high peaks. The total depth of the falls at the station was 1' 6". Snow accumulation on the high peaks was about 5' at the end of the period. Snowfall was below the average of the previous years.

Chopal.—Report for December only was available. Snow fell on 2 days in this month, the depth ranging from 2" at 4,000' to 4 $\frac{1}{2}$ " at 12,000'. Accumulation at the end of the month was estimated to be about 4 $\frac{1}{2}$ ' on the highest peak Chur. Snowfall was said to be about average.

III.—UTTAR PRADESH

Garhwal.—Snowfall was observed on the high hills on 4 occasions in October and on 11 occasions in December while no snow fell in November. The depth of the falls varied from 4" to 1' in October and 1" to 3 $\frac{1}{2}$ ' in December. These amounts also accumulated on the high altitudes at the end of the month. Snowfall was below the average in October.

Tehri Garhwal.—There was no snowfall in October and November. December witnessed widespread snowfall on 4 days on the high mountains, the snow descending to a height of about 4,500'. Snow accumulation at the end of the period was about 1' on the high peaks and was above normal.

Almora.—The following table gives the falls during and accumulation of snow at the end of October and December. Report for November was not received.

Locality	October	December
	ft.	ft.
<i>Falls</i>		
Malla Danpur	2	4-6
Malla Darma	$\frac{1}{2}$	2
Malla Johar	1-2	..
Byans . . . . .	..	2/3
Chaudans . . . . .	..	1/3
<i>Accumulations</i>		
Kotila Hill	$\frac{1}{2}$	2
Kotila Peak . . . . .	..	6
Kafini Hill	1	10-12
Kafini Valley . . . . .	..	15-20
Bankatia	1 $\frac{1}{2}$	16
Pinder Valley . . . . .	..	30-40
Pinder peak	1 $\frac{1}{2}$	200-220
Nanda Ghat	2	25-40
Sunderdhunga Valley . . . . .	..	30-35
Sunderdhunga Peak	2	10-15
Lipia Valley . . . . .	..	8
Mansurlek . . . . .	..	4
Lipu . . . . .	..	6
Nebudhara . . . . .	..	8
Panchuli	5	..

Snowfall was nearly normal.

Mukteswar (Kumaun) Observatory.—Report for December only was received. In this month one light intermittent fall and one moderate continuous fall with depth about 1" and 1 $\frac{1}{2}$ " respectively were observed at this observatory. Snowfall was light in character and was below average.

Summary

Cold Weather Period, January and February.—Snowfall during the period was generally below normal in Jammu and Kashmir, about normal in Uttar Pradesh and above normal in the Punjab (I) and Assam. Accumulation at the end of the period was below normal in Jammu and Kashmir, about normal in Uttar Pradesh and above normal in the Punjab (I).

Hot Weather Period, March to May.—Snowfall during the period was normal in the Punjab (I) and Uttar Pradesh and slightly above normal in Jammu and Kashmir. Accumulation of snow at the end of the period was about normal in the Punjab (I) and Uttar Pradesh and normal in Jammu and Kashmir.

Monsoon Period, June and July.—Snowfall was above normal in Jammu and Kashmir and below it in the Punjab (I) and Uttar Pradesh. Accumulation at the end of the period was normal in Jammu and Kashmir and below average in the Punjab (I) and Uttar Pradesh.

Monsoon Period, August and September.—Snowfall during the period was as usual confined to the higher altitudes. Both snowfall during and accumulation at the end of the period were about normal in Jammu and Kashmir and Uttar Pradesh.

Post Monsoon Period, October to December.—Snowfall and accumulation were about normal in Jammu and Kashmir and normal in Uttar Pradesh and the Punjab (I).

N.B.—It is not possible to adopt a single classification of season which will be satisfactory for the whole of India. The classification adopted in this publication is, however, considered as the most satisfactory one and the least open to objection especially from the point of view of rainfall.
